FACT SHEET

NPDES Permit Number:	AK-002143-1
Public Notice Start Date:	September 12, 2001
Public Notice Expiration Date:	October 12, 2001
Technical Contact:	Susan Poulsom 206/553-6258 1-800-424-4372 (within Region 10) poulsom.susan@epa.gov

The United States Environmental Protection Agency (EPA) Plans To Reissue A National Pollutant Discharge Elimination System (NPDES) Permit To:

CITY OF VALDEZ
WASTEWATER TREATMENT PLANT
800 South Sawmill Road
Valdez, Alaska 99686

and requests the state of Alaska to certify this NPDES permit and issue a consistency determination.

EPA Proposes NPDES Permit Reissuance

EPA proposes to reissue an NPDES permit to the City of Valdez. The draft permit places conditions on the discharge of pollutants from the wastewater treatment plant effluent to an unnamed stream (Alaska Department of Fish and Game (ADF&G) Catalog No. 221-60-11390) and the Port of Valdez.

This Fact Sheet includes:

- information on public comment, public hearing and appeal procedures;
- a description of the current discharge;
- a listing of past and proposed effluent limitations and other conditions;
- a map and description of the wastewater discharge; and
- detailed technical material supporting the conditions in the permit.

Alaska State Certification

EPA requests the Alaska Department of Environmental Conservation (ADEC) to certify the NPDES permit for the City of Valdez, under section 401 of the Clean Water Act (CWA). The state provided preliminary comments prior to the public notice which have been considered.

Alaska State Consistency Determination

EPA requests the state of Alaska, Office of Management and Budget, Division of Governmental Coordination, to review this action for consistency with the approved Alaska Coastal Management Program. For more information concerning this review, please contact Susan Magee at (907) 269-7472 (phone); (907) 269-3981 (fax); 550 West 7th Avenue, Suite 1660, Anchorage, Alaska 99501 or Susan_Magee@gov.state.ak.us.

Public Comment

The EPA will consider all comments before reissuing the final permit. Those wishing to comment on the draft permit or request a public hearing may do so in writing by the expiration date of the Public Notice. All comments should include name, address, phone number, a concise statement of basis of comment and relevant facts upon which it is based. A request for public hearing must state the nature of the issues to be raised as well as the requester's name, address and telephone number. All written comments should be addressed to the Office of Water Director at U.S. EPA, Region 10, 1200 6th Avenue, OW-130, Seattle, WA 98101; submitted by facsimile to (206) 553-0165; or submitted via e-mail at poulsom.susan@epa.gov.

After the Public Notice expires and all significant comments have been considered, EPA's Regional Director for the Office of Water will make a final decision regarding permit reissuance. If no comments requesting a change in the draft permit are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance. If significant comments are received, the EPA will address the comments and reissue the permit along with a response to comments. The permit will become effective 33 days after the issuance date, unless a request for an evidentiary hearing is submitted within 33 days.

Persons wishing to comment on State Certification should submit written comments by the public notice expiration date to the Alaska Department of Environmental Conservation c/o Tim Wingerter, 610 University Avenue, Fairbanks, Alaska 99709 or via email at Tim_Wingerter@envircon.state.ak.us.

Availability of Documents

The draft NPDES permit and other related documents can be obtained or reviewed by visiting or contacting EPA's Regional Office in Seattle between 8:30 a.m. and 4:00 p.m., Monday through Friday (See address below). Draft permits, Fact Sheets, and other information can also be found by visiting the Region 10 website at www.epa.gov/r10earth/water.htm.

United States Environmental Protection Agency (EPA)
Region 10
Park Place Building, 13th Floor
1200 Sixth Avenue, OW-130
Seattle, Washington 98101
(206) 553-0523 or
1-800-424-4372

The draft permit and fact sheet are also available at:

United States Environmental Protection Agency (EPA)
Alaska Operations Office
222 W. 7th Ave #19
Anchorage, Alaska, 99513-7588
(907)271-6561

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ACRONYMS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
AML	Average Monthly Limit
BMPs	Best management practices
BOD_5	Biochemical oxygen demand, five-day
°C	Degrees Celsius
cfs	Cubic feet per second
CFR	Code of Federal Regulations
CV	Coefficient of Variation
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FC	Fecal Coliform
ft/sec	feet per second
I/I	Inflow and Infiltration
lbs/day	Pounds per day
LTA	Long Term Average
mg/L	Milligrams per liter
ml	milliliters
ML	Minimum Level
µg/L	Micrograms per liter
mgd	Million gallons per day
MDL	Maximum Daily Limit
MPN	Most Probable Number
N	Nitrogen
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NOEC	No observed effect concentration
NR	Not required
OW	Office of Water
O&M	Operations and maintenance
POTW	Publicly owned treatment work
QAP	Quality assurance plan
RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
s.u.	Standard Units

TRE	Toxicity Reduction Evaluation
TSD	Technical Support document (EPA, 1991)
TSS	Total suspended solids
TUc	Toxic units (chronic)
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Services
WET	Whole effluent toxicity
WLA	Wasteload allocation
WQBEL	Water quality-based effluent limit
WWTP	Wastewater treatment plant

I. APPLICANT

City of Valdez
Wastewater Treatment Plant (WWTP)

Facility Location:	Mailing Address:
800 South Sawmill Road	P.O. Box 307
Valdez, Alaska 99686	Valdez, Alaska 99686

Facility Contact: Larry Weaver
(907) 835-4888

II. FACILITY INFORMATION

A. Treatment Plant Description

The Valdez WWTP is owned and operated by the City of Valdez (City). The facility serves a population of approximately 4,000 (in 2001). The collection system is 100 percent separated. The treatment plant treats primarily residential and commercial wastewater. There are no significant industrial dischargers to the facility.

The treatment plant has a design capacity of 1.5 million gallons per day (mgd). The average daily flow (in 2001) was 0.94 mgd. The facility provides secondary treatment and disinfection through chlorination. There are no on-site headworks. Comminutors are located in the main pump station ahead of the plant. Following the comminutors, the flow enters a 5-mile forcemain to the treatment plant. The treatment process includes two aerated lagoons, gas chlorination, a baffled chlorine contact/settling pond, and aeration. The treatment plant discharges to an unnamed stream identified by ADF&G as No. 221-60-11390. Additional information on the treatment plant, including a facility layout map, is provided in Appendix A.

B. Facility History

The Valdez WWTP was constructed in 1978. The facility was designed and constructed as a zero-discharge facility. It included two aerated lagoons and one percolation pond. Because of the high groundwater table, the facility never functioned as a zero-discharge facility. The percolation pond now serves as a chlorine contact/settling pond prior to discharge to Unnamed Stream No. 221-60-11390.

The treatment plant has had no major expansions or renovations. Facility modifications have included:

Date	Modification
1990	Two 3,000 aeration tanks were installed following Lagoon No. 3 to increase the effluent dissolved oxygen.
1992	An estimated 480,000 gallons of sludge were removed from lagoons.
1997	Baffles were installed in the chorine contact pond to increase detention time and prevent short circuiting.
2000	Bar screens were replaced with comminutors.

Planned upgrades for the treatment plant include:

- Sludge removal from Lagoon No. 1
  Currently, there is an estimated 2.5-foot layer of sludge at the bottom of Lagoon No. 1. The thick sludge laver covers the aeration diffusers.

- Installation of additional aeration piping and diffusers in Lagoon No. 1
  The diffusers will be located two feet above the bottom of the lagoon. The additional aeration piping and diffusers will be installed following sludge removal from the lagoon.

C. NPDES Permit History

Date	Action
August 15, 1975	Temporary NPDES permit allowed discharge of untreated effluent while a zero-discharge treatment facility was designed and constructed. Expiration Date: December 31, 1976.
December 1, 1978	Initial NPDES permit issued. It contained secondary treatment requirements. Expiration date: December 1, 1983.
January 31, 1983	The City applied for a waiver from secondary treatment under Section 301(h) of the CWA. The incentive for the waiver application was the City's concern that the WWTP would be unable to meet percent removal requirements for 5-day Biological Oxygen Demand (BOD_5) due to projected increases in plant flow as the

Date	Action
	result of population growth and increased Inflow/Infiltration (I/I) in the collection system.
March 26, 1985	Valdez withdraws 301(h) application.
March 26, 1985	Short-form application received to reissue permit.
September 4, 1985	Permit reissued. Expiration date: October 3, 1990.
April 3, 1990	Standard Form A application received to reissue permit. Under the conditions of 40 CFR § 122.6, the City is authorized to continue discharging under the terms of the 1985 permit until a new permit is reissued.
March 5, 2001	Standard Form A application received to reissue permit.

D. Treatment Plant Performance

A review of the Discharge Monitoring Reports (DMRs) from 1995 to 2001 shows that the Valdez WWTP has had difficulties complying with some terms of the 1985 permit. The DMR results are summarized in Table 1. Issues surrounding compliance with the 1985 permit limits are summarized below.

BOD_5 Percent Removal

The Valdez WWTP has had difficulty meeting the BOD_5 percent removal requirements. The treatment plant's percent BOD_5 removal performance varied with the influent BOD_5 concentrations, with the plant unable to meet percent removal requirements during low influent BOD_5 concentrations (less than 115 mg/L).

The City attributes the low influent BOD_5 concentrations to high I/I and customer freeze protection. Some customers run their water continuously during cold winter months to prevent the freezing of pipes.

BOD_5 Effluent Concentration and Mass Loading

BOD_5 effluent concentrations were low, with monthly averages generally around 15 mg/L. Although BOD_5 effluent concentrations were low, the treatment plant had several violations of the BOD_5 mass-based effluent limits. The average monthly BOD_5 mass-based limit in the 1985 permit (of 160 lbs/day) was calculated based on an assumed influent BOD_5 concentration of 100 mg/L, 85 percent BOD_5 removal, and a design flow of 1.25 mgd. This requirement essentially required the treatment plant to meet an average monthly BOD_5 concentration of 20 mg/L at the average daily flow of 0.94 mgd. The mass-based

limits in the draft permit are revised and are based on the design flow and effluent BOD_5 concentration limits.

Total Residual Chlorine

The Valdez WWTP reported exceedances of the 1985 permit chlorine limit (of 0.01 mg/L) several times during the last five years. The 1985 permit limit for chorine is 0.01 mg/L, which is below the Minimum Level (i.e. reporting level) for chlorine of 0.1 mg/L using EPA approved analytical methods. The reported chlorine concentration exceeded the chlorine ML (of 0.1 mg/L) four times from January 1995 to May 2001.

TABLE 1. SUMMARY OF VALDEZ WWTP DMR DATA (January 1995 to May 2001)

Parameter	Units	1985 Permit Limit	Range of Reported Values	Average of Reported Values	Number of Violations
Flow Average Monthly Effluent	mgd	1.25	0.61 - 1.67	0.94	2
BOD_5 Average Monthly Influent	mg/L	NA	28 - 215	96	NA
	lbs/day	NA	270 - 1,470	743	NA
BOD_5 Average Monthly Effluent	mg/L	30	6 - 37	15	1
	lbs/day	160	55 - 515	119	7
BOD_5 Average Weekly Effluent	mg/L	45	7 - 60	18	1
	lbs/day	240	67 - 835	145	4
BOD_5 Percent Removal	percent	85	51 - 94	83	38
TSS Average Monthly Influent	mg/L	NA	63 -228	111	NA
	lb/day	NA	469 - 1,778	868	NA
TSS Average Monthly Effluent	mg/L	30	2 - 21	8	0
	lb/day	160	11 - 177	62	1
TSS Average Weekly Effluent	mg/L	45	2 - 36	11	0
	lb/day	240	11 - 282	86	2
TSS Percent Removal	percent	65	78 - 99	92	0
Fecal Coliform Bacteria Average Monthly	colonies/ 100 mL	200	9 - 393	104	7
Fecal Coliform Bacteria Average Weekly	colonies/ 100 mL	400	20 - 748	209	5
pH	s.u.	6.5 - 9	6.5 - 8.9	NA	0

TABLE 1. SUMMARY OF VALDEZ WWTP DMR DATA (January 1995 to May 2001)					
Parameter	**Units**	**1985 Permit Limit**	**Range of Reported Values**	**Average of Reported Values**	**Number of Violations**
Total Residual Chlorine	mg/L	0.01	0.01 - 0.40	0.02	16[1]
Dissolved Oxygen	mg/L	7.0	5.3 - 10.5	7.8	2

NA = Not Applicable

Notes:
1 The reported chlorine concentrations exceeded the Minimum Level for chlorine (of 0.1 mg/L) four times during the same time period.

III. RECEIVING WATER

A. Description

The Valdez WWTP discharges through Outfall 001 located at latitude 61° 6' 45" N and longitude 146° 16' 30" W to an unnamed stream identified by the ADF&G catalog as No. 221-60-11390. The stream was originally constructed as part of the treatment facility to dewater the area around the lagoons. Following construction, salmon used the stream as a spawning habitat. The stream is classified as a anadromous stream.

The stream begins about 25 to 30 feet upstream of the WWTP outfall. The stream flows to the north shore of Port Valdez, a deepwater fjord in Prince William Sound. According to treatment plant personnel, the distance along the stream from the WWTP outfall to Port Valdez varies from approximately 300 feet to 1,300 feet depending on the tides.

The United States Geological Service (USGS) does not have a gaging station on the stream, and there is no flow information available on the stream.

B. Water Uses

The state of Alaska water quality standards (ADEC, 2000) designate the beneficial uses for water bodies. Beneficial uses for Unnamed Stream No. 221-60-11390 are: water supply, primary and secondary contact recreation, and growth and propagation of fish, shellfish, other aquatic life and wildlife.

Beneficial uses for Port Valdez are: aquaculture, seafood processing and industrial water supply; primary and secondary contact recreation; growth and propagation of fish, shellfish, other aquatic life, and wildlife; and harvesting for consumption of raw mollusks or other raw aquatic life. (18 AAC 70.020)

C. Mixing Zone

The State has authorized a mixing zone in its preliminary comments on the draft permit. The State considers the unnamed stream to be an extension of the outfall for fecal coliform since recreation does not occur in the stream. A fecal coliform mixing zone of a 100 meter radius at the entry point into Port Valdez is provided. This mixing zone provides a minimum dilution factor of 19:1. A mixing zone has not been determined in the stream for chlorine due to the lack of flow information. Because the stream is used for fish spawning it is appropriate to protect the fish prior to the outlet to Port Valdez. If the State amends the mixing zone in the final 401 certification, then the reasonable potential determination and permit limits will be re-calculated for the final permit.

IV. EFFLUENT LIMITATIONS

The EPA followed the CWA, state and federal regulations, and EPA's 1991 *Technical Support Document for Water Quality-Based Toxics Control* (TSD) to develop the effluent limits in the draft permit. Effluent limitations were developed based on technology available to treat the pollutants (technology-based limits) and limits that are protective of the designated uses of the receiving water (water quality-based limits). In general, the CWA requires that the effluent limits for a particular pollutant be the more stringent of either the technology-based limit or water quality-based limit.

Table 2 presents the draft City of Valdez WWTP effluent limitations, along with the effluent limitations in the 1985 permit. Effluent limits for both BOD_5 and TSS are technology-based. Effluent limits for fecal coliform, chlorine, pH, and dissolved oxygen are water quality-based. In addition, the draft permit includes narrative water quality-based limits. Appendices B and C further describe the development of the effluent limits.

TABLE 2. PROPOSED EFFLUENT LIMITS									
Parameter	**Units**	**Monthly Average**		**Weekly Average**		**Maximum Daily**		**Minimum Daily**	
		1985 Permit	**2001 Draft**	**1985 Permit**	**2001 Draft**	**1985 Permit**	**2001 Draft**	**1985 Permit**	**2001 Draft**
BOD_5	mg/L	30	30	45	45	---	60	---	--
	lbs/day	160	375	240	563	---	751	---	---
	% removal June 1 to Sept. 30	85	85	---	---	---	---	---	---
	% removal Oct. 1 to May 31	85	80	---	---	---	---	---	---
TSS	mg/L	30	30	45	45	---	60	---	---
	lbs/day	160	375	240	563	---	751	---	---
	% removal June 1 to Sept. 30	65	85	---	---	---	---	---	---
	% removal Oct. 1 to May 31	65	75	---	---	---	---	---	---
Fecal Coliform	FC/100 mL	200	200	400	400	800	800	---	---
Total Residual Chlorine[1]	µg/L	---	1	---	---	10	4	---	---
	lbs/day	---	0.02	---	---	---	0.05	---	---
pH	s.u.	—	—	—	—	9.0	8.5	6.5	6.5
DO	mg/L	---	---	---	---	---	---	7.0	7.0
Flow	mgd	---	---	1.25	---	---	---	---	---

Notes:
1 The effluent limits for chlorine are not quantifiable using EPA approved analytical methods. The permittee will be in compliance with the effluent limits provided the total chlorine residual is at or below the compliance level of 100 µg/L.

V. MONITORING REQUIREMENTS

A. Influent and Effluent Monitoring

Section 308 of the CWA and federal regulation 40 CFR § 122.44(i) require that monitoring be included in permits to determine compliance with effluent limitations. Monitoring may also be required to gather data for future effluent limitations or to monitor effluent impacts on receiving water quality. The permittee is responsible for conducting the monitoring and for reporting results on monthly DMRs to the EPA. Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling

necessary to adequately monitor the facility's performance. Table 3 presents the monitoring requirements for the draft permit as well as the monitoring requirements for the 1985 permit.

TABLE 3. EFFLUENT MONITORING REQUIREMENTS

Parameter	Units	Location	Sample Frequency		Sample Type
			1985 Permit	Draft Permit	
BOD_5[1]	mg/L	Influent and Effluent	weekly[2] 2/month[3]	1/week	24-hour composite
TSS[1]	mg/L	Influent and Effluent	weekly[2] 2/month[3]	1/week	24-hour composite
Fecal coliform bacteria	FC/100 mL	Effluent	2/week	2/week	grab
Total residual chlorine	mg/L	Effluent	2/week	2/week	grab
pH	s.u.	Effluent	2/week	2/week	grab
DO	mg/L	Effluent	2/week	2/week	grab
Flow	mgd	Effluent	continuous	continuous	recording
Residue	---	Effluent	NR	1/week	visual
Temperature	°C	Effluent	NR	1/month	grab
Ammonia, total (as N)	mg/L	Effluent	NR	1/month	grab
WET	TU_c	Effluent	NR	1/quarter[4]	24-hour composite

NR = Not Required

1 Influent and effluent composite samples shall be collected during the same 24-hour period.
2 Monitoring frequency from May 1 through August 31.
3 Monitoring frequency from September 1 through April 30
4 Required during fourth year of permit only.

B. Ambient Monitoring

The draft permit requires the permittee to conduct upstream and downstream (at the edge of the mixing zone) ambient monitoring. Table 4 presents the proposed ambient monitoring requirements for the draft permit. Ambient monitoring results will be used to verify the assumptions made in developing the permit limits with regards to the receiving water conditions. Based on the monitoring results, the EPA will determine whether or not to revise permit limits when the permit is renewed.

TABLE 4. AMBIENT MONITORING REQUIREMENTS				
Parameter	**Units**	**Sample Frequency**	**Sample Location**	**Sample Type**
Ammonia, total (as N)	mg/L	1/quarter[1]	Upstream in Unnamed Stream No. 221-60-11390	grab
Fecal coliform bacteria (May 1 - September 31)	FC/100 mL	1/month	3 sites at edge of mixing zone in Port Valdez[2]	grab
Fecal coliform bacteria (October 1 - April 30)	FC/100 mL	1/quarter	3 sites at edge of mixing zone in Port Valdez[2]	grab
Flow	mgd	1/quarter	Upstream in Unnamed Stream No. 221-60-11390	Recording
Residue	---	1/quarter	Downstream in Unnamed Stream No. 221-60-11390[3]	visual
pH	s.u.	1/quarter	Downstream in Unnamed Stream No. 221-60-11390[3]	grab
Temperature	°C	1/quarter	Downstream in Unnamed Stream No. 221-60-11390[3]	grab

1 The quarterly monitoring shall be conducted on a calender quarter (i.e. Jan to March, April to June, July to Sept., and Oct. to Dec.)
2 Monitoring shall occur at the edge of the mixing zone (or as close to the edge of the mixing zone as is practical due to site and access limitations). The mixing zone is the area within a 100 meter radius of the entry point of the unnamed stream into Port Valdez.
3 Monitoring downstream in the unnamed stream shall occur 30 meters from the discharge point of the outfall.

C. Representative Sampling

The requirement in the federal regulations regarding representative sampling (40 CFR § 122.41[j]) has been expanded to specifically require sampling whenever a bypass, spill, or non-routine discharge of pollutants occurs, if the discharge may reasonably be expected to cause or contribute to a violation of an effluent limit under the permit. This provision is included in the draft permit because routine monitoring could easily miss permit violations and/or water quality standards exceedances resulting from bypasses, spills, or non-routine discharges. This requirement directs the permittee to conduct additional, targeted monitoring to quantify the effects of these occurrences on the final effluent discharge.

D. Whole Effluent Toxicity

Whole effluent toxicity (WET) is a term used to describe the aggregate toxic effect of an aqueous sample (e.g., effluent wastewater discharge) as measured according to an organism's response upon exposure to the sample. WET tests are laboratory tests that replicate to the greatest extent possible the total effect and actual environmental exposure of aquatic life to effluent toxicants without

requiring the identification of specific toxicants. The tests use small vertebrate and invertebrate species, and/or plants. The effluent concentration that results in the survival of 50% of test organisms during a 96-hour exposure determines the short-term (acute) toxicity. The highest effluent concentration that causes reduced growth or reduced reproduction of test organisms and/or plants during a 7-day exposure determines the long-term (chronic) toxicity.

The municipal application regulations (40 CFR § 122.21(j)(1)) require publicly owned treatment works (POTWs) with design flows equal to or greater than 1.0 mgd to submit results of WET testing with their permit application. Federal regulation 40 CFR § 122.44(d)(1) requires that permits contain limits on WET when a discharge has reasonable potential to cause or contribute to an exceedance of a water quality standard.

Alaska State Water Quality Standard 18 AAC 70.030 states that "an effluent discharged to a water may not impart chronic toxicity to aquatic organisms, expressed as 1.0 chronic toxic unit (TUc), at the point of discharge (or if ADEC authorizes a mixing zone in a permit, approval, or certification, at or beyond the mixing zone boundary) based on the minimum effluent dilution achieved in the mixing zone. If the ADEC determines that an effluent has reasonable potential to cause or contribute to exceedance of this limit, the department will require whole effluent toxicity limitations as a condition of a permit, approval, or certification."

Because WET data is not available to evaluate whether or not the facility has achieved the state standard, the draft permit requires quarterly chronic WET testing of the treatment plant effluent during the fourth year of the permit. The results of the WET test shall be submitted with the DMR for the corresponding month and a final report will be due by the end of the following month. Based on the minimum dilution of 50, an effluent trigger of 50 TUc is established in the draft permit. If the effluent exceeds the trigger, additional testing is required. If additional tests continue to demonstrate that the trigger is being exceeded, the permittee will be required to conduct a Toxicity Reduction Evaluation (TRE). A TRE is a site-specific study conducted to identify the cause of the toxicity and to evaluate toxicity control options.

VI. OTHER PERMIT CONDITIONS

A. Sludge Management

The proposed NPDES wastewater permit no longer contains requirements related to sewage sludge. EPA Region 10 has recently decided to change the regional approach to permitting the disposal of biosolids (“sewage sludge” or “sludge”) and to separate wastewater and sludge into separate permits. EPA will likely

issue a sludge only permit to this facility at a later date. Sludge permit coverage may be in the form of a general permit in which EPA can cover and better serve multiple facilities with similar limitations and management requirements.

The CWA prohibits the use or disposal of biosolids not in compliance with 40 CFR Part 503 and provides EPA with the authority to enforce these regulations directly (even in the absence of a permit). The state of Alaska currently conducts a program to regulate the management of biosolids. If the applicant performs sludge activities in accordance with the federal and state regulations, the environment should be protected until such time as a sludge only permit is prepared for this facility.

The proposed permit requires the permittee to update the biosolids permit application (form 2S) for this facility as necessary.

B. Quality Assurance Plan (QAP)

The federal regulation at 40 CFR § 122.41(e) requires the permittee to develop and submit a Quality Assurance Plan (QAP) to ensure that the monitoring data submitted are accurate and to explain data anomalies if they occur. The permittee is required to complete a QAP within **180 days** of the effective date of this permit. The QAP shall consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting.

C. Best Management Practices (BMPs)

Section 402 of the CWA and federal regulation 40 CFR § 122.44(k) authorize EPA to require best management practices (BMPs) in NPDES permits. BMPs are measures for controlling the generation of pollutants and their release to waterways. For municipal facilities, these measures are typically included in the facility Operation & Maintenance (O&M) plans. These measures are important tools for waste minimization and pollution prevention.

The draft permit requires the City to develop a plan and implement BMPs within **180 days** of the effective date of this permit. EPA has a guidance manual (EPA, 1993) that may provide some assistance in the development of BMPs. Specifically, the City must consider spill prevention and control, optimization of chemical use, public education aimed at controlling the introduction of household hazardous materials to the sewer system and water conservation. Furthermore, it is considered a good management practice to maintain a log of daily plant operations and observations.

To the extent that any of these issues have already been addressed, the City need only reference the appropriate document/section in its O&M plan. Additionally, the BMP operating plan must be amended whenever there is a change in the facility or in the operation of the facility which materially increases the potential for an increased discharge of pollutants.

VII. OTHER LEGAL REQUIREMENTS

A. Endangered Species Act

The Endangered Species Act (ESA) requires federal agencies to consult with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) if the agency's actions could beneficially or adversely affect any threatened or endangered species. The EPA has tentatively determined that the discharge has **no effect** on the listed threatened and endangered species identified by the services below.

The EPA requested a listing of threatened or endangered species in the vicinity of the Valdez WWTP from NMFS (H.B. Hill, letter, March 20, 2000) and from USFWS (H.B. Hill, letter, March 20, 2000; S. Poulsom, personal communication and fax, July 26, 2001).

The USFWS indicated that no listed species are anticipated to occur within the project area (Davenport, letter, March 28, 2000). Further, no critical habitat coincides with the project area. During a follow-up telephone discussion, the USFWS confirmed that there had been no changes in the status of the threatened or endangered species or critical habitat (C. Sterne, personal communication, July 18, 2001).

The NMFS indicated that of the listed species, the Steller sea lion (*Eumetopias jubatus*) occurs in the nearshore waters of Port Valdez and Prince William Sound (Balsiger, letter, August 6, 2001). The Steller sea lion is distributed around the North pacific rim from the Channel Islands off Southern California to northern Hokkaido, Japan. Their distribution extends northward into the Bering Sea and along the eastern shore of the Kamchatka Peninsula. The center of distribution is in the Gulf of Alaska and the Aleutian Islands. Within this distribution, the land sites used by the sea lions are referred to as rookeries and haulout sites. The Valdez WWTP does not discharge near any Steller sea lion rookeries (3 mile buffer included) or haulout sites.

The EPA will provide NMFS and USFWS with copies of the draft permit and fact sheet during the public notice period. Any comments received from these

agencies regarding this determination will be considered prior to the reissuance of this permit.

B. Essential Fish Habitat

Section 305(b) of the Magnuson-Stevens Act (16 USC 1855(b)) requires federal agencies to consult with the NMFS when any activity proposed to be permitted, funded, or undertaken by a federal agency may have an adverse effect on designated Essential Fish Habitat (EFH) as defined by the Act. The EFH regulations define an *adverse effect* as any impact which reduces quality and/or quantity of EFH and may include direct (e.g. contamination or physical disruption), indirect (e.g. loss of prey, reduction in species' fecundity), site-specific, or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

The EPA has tentatively determined that issuance of this permit is **not likely to adversely effect** EFH in the vicinity of the discharge. An EFH assessment is included in Appendix D. The EPA will provide NMFS with copies of the draft permit and fact sheet during the public notice period. Any comments received from NMFS regarding EFH will be considered prior to the reissuance of this permit.

C. State Certification

Section 401 of the CWA requires EPA to seek certification from the State that the permit is adequate to meet State water quality standards before issuing a final permit. The regulations allow for the State to stipulate more stringent conditions in the permit, if the certification cites the CWA or State law references upon which that condition is based. In addition, the regulations require a certification to include statements of the extent to which each condition of the permit can be made less stringent without violating the requirements of State law.

D. Coastal Zone Management Act (CZMA)

The applicant has certified that the activities authorized by the draft permit are consistent with the Alaska Coastal Management Plan. Pursuant to 40 CFR § 122.49(d), requirements of the State coastal zone management program must be satisfied before the permit may be reissued. The draft permit and fact sheet containing the determination will be submitted to the State of Alaska Dept. of Governmental Coordination for state interagency review at the time of the public notice.

E. Permit Expiration

This permit will expire five years from the effective date of the permit.

VIII. REFERENCES

EPA. 1991. *Technical Support Document for Water Quality-based Toxics Control.* Office of Water, EPA/505/2-90-001, March 1991.

EPA. 1993. *Guidance Manual for Developing Best Management Practices (BMP).* Office of Water, EPA/833/B-93-004.

EPA. 1996. *U.S. EPA NPDES Permit Writer's Manual.* Office of Water, EPA/833/B-96-003.

ADEC. 2000. 18 AAC 70 *Water Quality Standards,* September 29, 2000.

Appendix A
Wastewater Treatment Plant Information

Treatment Plant Criteria	
Treatment Plant Design Flow Rate	1.5 mgd
Comminutors	Located 5 miles upstream of the treatment plant. Following comminution, the flow is delivered to the treatment plant via a 5-mile force main
Aeration Lagoons	
Number of Lagoons	2 - operated in series
Dimensions	12 feet deep x 270 feet x 690 feet (each)
Detention Time at Design Flow	22 days
Detention Time at Maximum Daily Peak Flow (in 2000)	19 days
Surface Area	372,600 square feet
Volume	33.4 million gallons
BOD Loading at Average Influent BOD of 119 lbs per day	14 lbs/day-acre
Chlorination	
Type	Gas
Contact Basin Pond Dimensions	4 feet deep x 270 feet x 690 feet
Aeration (for Dissolved Oxygen)	
Number of Basins	2
Volume	3,000 gallons (each)

Location Maps (In Separate File)

Facility Layout (In Separate File)

Appendix B
Basis for Effluent Limitations

Sections 101, 301(b), 304, 308, 401, 402 and 405 of the CWA provide the basis for the effluent limitations and other conditions in the draft permit. The EPA evaluates discharges with respect to these sections of the CWA and the relevant NPDES regulations to determine which conditions to include in the draft permit.

In general, the EPA first determines which technology-based limits must be incorporated into the permit. The EPA then evaluates the effluent quality expected to result from these controls, to assess the potential for any exceedances of the water quality standards in the receiving water. If exceedances could occur, EPA must include more stringent water quality-based limits in the permit. The draft permit limits reflect whichever requirements (technology-based or water quality-based) are more stringent.

A. Technology-Based Effluent Limitations

Technology-based limits for publicly owned treatment works (POTWs) are derived from secondary treatment standards (40 CFR § 133.102) or equivalent to secondary treatment standards (40 CFR § 133.105) and based on end-of-pipe technology. For POTWs, technology-based limits cover three parameters: Biochemical Oxygen Demand, five-day (BOD_5), total suspended solids (TSS) and pH. These limitations are listed in Table B-1.

TABLE B-1: SECONDARY TREATMENT REQUIREMENTS FOR POTWS

Parameter	Average Weekly Limit	Average Monthly Limit	Percent Removal
BOD_5	45 mg/L	30 mg/L	85%
SS	45 mg/L	30 mg/L	85%
pH	between 6.0 and 9.0 standard units		

POTWs are required to meet secondary treatment standards with few exceptions. One of those exceptions was considered in defining effluent limitations for the Valdez WWTP. Treatment works that receive less concentrated wastes from separate sewer systems can qualify to have their percent removal limit reduced provided that they meet all of the following requirements: 1) the facility can consistently meets its permit effluent concentration limits but cannot meet its percent removal limits because of less concentrated effluent water 2) the facility would have been required to meet significantly more stringent limitations than would otherwise be required by the concentration-based standards and 3) the less concentrated effluent is not the result of excessive I/I.

B. Water Quality-Based Evaluation

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits to meet water quality standards. Discharges to state waters must also comply with limitations imposed by the state as part of its certification of NPDES permits under section 401 of the CWA.

The NPDES regulation (40 CFR § 122.44(d)(1)) implementing section 301 (b)(1)(C) of the CWA requires that permits include limits for all pollutants or parameters which "are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality."

The regulations require that this evaluation be made using procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water. The limits must be stringent enough to ensure that water quality standards are met, and must be consistent with any available wasteload allocation.

The EPA uses the following approach to determine whether water quality-based limits are needed and to develop those limits when necessary:

1. Determine the appropriate water quality criteria
2. Determine whether there is "reasonable potential" to exceed the criteria
3. If there is "reasonable potential", develop Wasteload Allocations (WLAs)
4. Develop effluent limitations based on WLAs

The following sections provide a discussion of this approach. The calculations associated with the approach which were used to develop the limits are presented in Appendix C.

1. Water Quality Criteria

   The first step in developing water quality-based limits is to determine the applicable water quality criteria. For Alaska, the State water quality standards are located in 18 AAC 70.020.2. The applicable criteria are determined based on the beneficial uses of the receiving water. For any given pollutant, different uses may have different criteria. To protect all beneficial uses, the permit limits are based on the most stringent of the water quality criteria applicable to those uses.

   In deriving the permit limits, the EPA considered protecting the beneficial uses of Unnamed Stream No. 21-60-11390, as well as the beneficial uses of Port Valdez. The beneficial uses are listed in Section III of this Fact Sheet.

2. Reasonable Potential

In evaluating the need for Water Quality-Based Effluent Limits (WQBELs), a projection of the receiving water concentration (downstream of where the effluent enters the receiving water) for each pollutant of concern is made. If the projected downstream concentration of the receiving water exceeds the numeric criterion for a specific chemical, then there is the "reasonable potential" that the discharge may cause or contribute to an excursion above the applicable water quality standard, and a WQBEL is required.

In some cases, a mixing zone provides dilution of the effluent. Mixing zone allowances will increase the mass loading of the pollutant to the water body, and decrease treatment requirements. Mixing zones can be used only when there is adequate ambient flow volume and the ambient water is below the criteria necessary to protect designated uses.

EPA has used the recommendations in Chapter 3 of the TSD to conduct the "Reasonable Potential" analysis for the Valdez WWTP. Appendix C steps through the Reasonable Potential analysis and presents a sample calculation.

3. Wasteload Allocations

Once it has been determined that a WQBEL is required for a pollutant, the first step in developing a permit limit is development of a WLA for the pollutant. A WLA is the concentration (or loading) of a pollutant that the permittee may discharge without causing or contributing to an exceedance of water quality standards in the receiving water.

The CWA allows mixing zones (or zones of dilution in the receiving water body) at the discretion of the State when their water quality standards permit them. The state of Alaska water quality standards allows the exceedance of water quality criteria within a mixing zone authorized by ADEC when the receiving water quality meets state water quality standards. The allowed mixing zones do not impair the integrity of the water body as a whole, do not allow lethality to organisms passing through, and do not pose any serious health risks considering likely pathways of exposure. In the case of a state approved mixing zone, the WLA is calculated as a mass balance, based on the available dilution, background concentrations of the pollutants, and the State water quality criteria.

In some cases a mixing zone cannot be authorized, for example when the receiving water already exceeds the criteria or the receiving water flow is too low to provide dilution, or dilution information is unavailable. In such cases, the

criterion becomes the WLA. Establishing the criterion as the WLA ensures that the permittee will not contribute to an exceedance of the criteria.

In general, the period over which a criterion applies is based on the length of time the target organism can be exposed to the pollutant without adverse effect. For example, aquatic life criteria generally apply as one-hour averages (acute criteria) or four-day averages (chronic criteria). Because the different criteria apply over different time frames it is not possible to compare them directly to determine which criterion results in the most stringent limits. To allow for comparison, each criterion is statistically converted to a long-term average effluent concentration. The criterion that results in the most stringent long-term average concentration is the WLA that is used to calculate the permit limits.

4. Permit Limits

Once the WLA has been developed, EPA applies the statistical permit limit derivation approach described in Chapter 5 of the TSD to obtain daily maximum and monthly average permit limits. This approach takes into account effluent variability, sampling frequency, water quality standards, and the difference in time frames between the monthly average and daily maximum limits. Appendix C provides further explanation of permit limit derivation.

C. Basis for Effluent Limits and Monitoring Requirements for Specific Pollutants

The draft permit includes effluent limitations for BOD_5, TSS, fecal coliform bacteria, pH, temperature, total residual chlorine, DO, and residues. In addition to these parameters, monitoring requirements have also been specified for ammonia, WET, temperature, and flow. The basis for the effluent limits and monitoring requirements for each of these parameters are discussed below. The discussion includes applicable technology-based standards and a determination whether there is reasonable potential for violation of water quality standards. Where reasonable potential exists, limits are developed and are incorporated into the draft permit.

1. BOD_5

The Valdez WWTP is a secondary treatment POTW and therefore subject to the federal technology-based requirements for BOD_5 of 40 CFR § 133.102 which are:

30-day average:	30 mg/L
7-day average:	45 mg/L
Removal:	85%

Historical data for the treatment plant indicate that during periods of low influent BOD concentrations, the facility has difficulty achieving BOD removal requirements in spite of consistently achieving BOD effluent concentration limits. The City has attributed the low influent BOD concentrations to customer freeze protection and I/I. Customers run their water continuously during cold winter months to prevent freezing of pipes.

In accordance with 40 CFR § 133.103 (d), treatment works that receive less concentrated wastes from separate sewer systems can qualify to have their percent removal limit reduced provided that all of the following are met: 1) the facility can consistently meet its permit effluent concentration limits but cannot meet its percent removal limits because of less concentrated effluent water 2) the facility would have been required to meet significantly more stringent limitation than would otherwise be required by the concentration-based standards and 3) the less concentrated effluent is not the result of excessive inflow/infiltration (I/I).

40 CFR § 133.103 (e) and 40 CFR § 35.2005 (b)(16) (28) and (29) provide definitions and criteria of excessive I/I. Excessive I/I is the I/I which can be economically eliminated from a sewer system as determined in a cost-effectiveness analysis that compares the costs for correcting the I/I conditions to the total costs for transportation and treatment of the I/I. Inflow is not excessive if the total flow to the POTW during a storm event does not exceed 275 gallons per capita per day.

The permittee has not met the criterion that the total flow to the POTW be less than 275 gallons per capita per day during a storm event. Based on a service area population of 4,000, this criterion would require a flow of less than 1.1 mgd during storm events. Both the maximum daily flow and the average monthly flow have exceeded 1.1 mgd, indicating that the system may have excessive I/I. However, the City has provided documentation of their efforts to reduce I/I in their system. In 1981, the City began investigating and repairing/rehabilitating sources of I/I. The City has an annual budget for its I/I reduction program. The EPA considers this work sufficient evidence that the City has eliminated the I/I that could be economically eliminated from the system. Therefore, the BOD percent removal requirement has been reduced to 80% during periods of low influent BOD concentrations (October 1 through May 31). The City should continue its efforts to reduce I/I.

A daily BOD_5 of 60 mg/L has been included in the permit. This limit is based on state regulation 18 AAC 72.990 relating to wastewater disposal.

EPA methodology and Federal regulations at (40 CFR §122.45 (b) and 122.45 (f)) require BOD_5 limitations to be expressed as mass-based limits. Mass-based limits are calculated based on the following formula:

Mass Loading (lbs/day) = Concentration Limit (mg/L) x Design Flow (mgd) x 8.34

where,

8.34 = conversion factor

The BOD_5 mass limits are:

Monthly BOD_5 Loading = 30 mg/L x 1.5 mgd x 8.34 = 375 lbs/day
Weekly BOD_5 Loading = 45 mg/L x 1.5 mgd x 8.34 = 563 lbs/day
Daily BOD_5 Loading = 60 mg/L x 1.5 mgd x 8.34 = 751 lbs/day

The monitoring frequency for BOD_5 is modified in the draft permit to once per week throughout the year instead of a reduced monitoring schedule of twice per month from September 1 through May 1. A reduced monitoring schedule was included in the 1985 permit since it was anticipated that any difficulty with compliance would be the result of plant upsets during the warm weather months when algal growth may be aggravated. A review of DMR data indicate that the treatment plant has more difficulty in compliance during the cooler, wet weather months because of low influent concentrations. Therefore, the monitoring has not been reduced during this time period.

2. TSS

The Valdez WWTP is a secondary treatment POTW and therefore subject to the federal technology-based requirements for TSS. Secondary treatment standards for TSS are:

30-day average:	30 mg/L
7-day average:	45 mg/L
Removal:	85%

In the 1985 permit, the facility was granted equivalent to secondary limits for TSS percent removal. The basis for the lower removal requirement (65%) was the lack of existing data for influent TSS concentrations, the lack of existing data for TSS percent removal, and the assertion that "waste stabilization ponds typically cannot achieve 85% removal."

Based on a review of the historical data, the equivalent to secondary treatment limitations no longer apply to the Valdez WWTP. Equivalent to secondary

treatment limitations only apply if the effluent quality consistently achieved, despite proper operation and maintenance is in excess of 30 mg/L TSS. The TSS monthly average for the Valdez WWTP from January 1995 through May 2001 was 21 mg/L (well below the concentration limit of 30 mg/L).

However, based on the historical data, the plant would be unable to meet an 85% TSS removal limit during periods of low influent TSS concentrations. Because of the low influent TSS concentrations from October through May, the draft permit designates a TSS percent removal of 75% during this period. From June through September, an 85% removal TSS limit will be required. As with BOD, in accordance with 40 CFR § 133.103 (d), treatment works that receive less concentrated wastes from separate sewer systems can qualify to have their percent removal limit reduced provided that all of the following are met: 1) the facility can consistently meet its permit effluent concentration limits but cannot meet its percent removal limits because of less concentrated effluent water 2) the facility would have been required to meet significantly more stringent limitation than would otherwise be required by the concentration-based standards and 3) the less concentrated effluent is not the result of excessive inflow/infiltration (I/I). (Refer to I/I discussion under BOD_5).

A daily TSS limit of 60 mg/L has been included in the permit. This limit is based on state regulation 18 AAC 72.990 relating to wastewater disposal.

EPA methodology and Federal regulations at (40 CFR §122.45 (b) and 122.45 (f)) require TSS limitations to be expressed as mass-based limits where:

Mass Loading (lbs/day) = Concentration Limit (mg/L) x Design Flow (mgd) x 8.34

where,

8.34 = conversion factor

The TSS mass limits are:

Monthly TSS Loading = 30 mg/L x 1.5 mgd x 8.34 = 375 lbs/day
Weekly TSS Loading = 45 mg/L x 1.5 mgd x 8.34 = 563 lbs/day
Daily TSS Loading = 60 mg/L x 1.5 mgd x 8.34 = 751 lbs/day

The monitoring frequency for TSS is modified in the draft permit to once per week throughout the year instead of a reduced monitoring schedule of twice per month from September 1 through May 1. A reduced monitoring schedule was designated in the 1985 permit since it was anticipated that any difficulty with compliance would be the result of plant upsets during the warm weather months when algal growth may be aggravated. A review of recent data indicate that the

treatment plant has more difficulty in compliance during the cooler, wet weather months because of low influent concentrations. Therefore, the monitoring is not reduced during this time period.

3. Fecal Coliform Bacteria

The most stringent state water quality standards for fecal coliform (FC) are:

Fresh Water Uses:
In a 30-day period, the geometric mean may not exceed 20 FC/100 ml, and not more than 10% of the samples may exceed 40 FC/100 ml.

Marine Water Uses:
Based on a 5-tube decimal dilution test, the FC median Most Probable Number (MPN) may not exceed 14 FC/100 ml, and not more than 10% of the samples may exceed a FC median MPN of 43 FC/100 ml.

The State has authorized the following limits for fecal coliform for effluent discharged from Valdez WWTP based on a 19:1 dilution:

Average Monthly	200 FC/100 ml
Average Weekly	400 FC/100 ml
Maximum Daily	800 FC/100 ml

These levels are the same as in the 1985 permit. In order to assure compliance in Port Valdez at the edge of the mixing zone, ambient monitoring is included in the draft permit.

4. Total Residual Chlorine

The Valdez WWTP uses chlorine to disinfect the effluent. The most stringent state water quality criteria for total residual chlorine for protection of fresh water aquatic life are:

19 µg/L (acute)
2 µg/L (chronic)

An analysis was performed to determine if chlorine has reasonable potential to violate water quality standards (see Appendix C Example Calculation). In developing the permit limit, the EPA looked at the impact on the receiving water without dilution since dilution in the unnamed stream is unavailable. It is the EPA's position that the residual chlorine should be limited in the effluent to reduce toxicity effects to fish species found in the receiving water. The draft permit limits are below the Minimum Level (ML) specified for EPA-approved

analytical methods for total residual chlorine. Therefore, the compliance level for chorine in the draft permit is 0.100 mg/L (100 µg/L).

5. pH

Federal regulations (40 CFR § 133.102) specify a technology-based range for pH from 6.0 to 9.0 standard units. The most stringent State water quality standards for both fresh and marine water uses require that ambient pH be in the range of 6.5 to 8.5 standard units. The draft permit incorporates the more stringent water quality based standards of 6.5 to 8.5 in the draft permit. This range is more stringent than the 1985 permit which designated a pH range from 6.5 to 9.0.

6. Dissolved Oxygen (DO)

Alaska water quality standards (18AAC 70.020(b)) for freshwater DO are:

Waters used by anadromous and resident fish	≥ 7.0 mg/L
Depth of 20 centimeters in the interstitial waters of gravel used by anadromous or resident fish for spawning	≥ 5.0 mg/L

The 1985 permit specified a DO concentration of greater than or equal to 7.0 mg/L to protect the unnamed stream for anadromous fish. The Valdez WWTP has been able to meet that requirement. The draft permit for DO remains at greater than or equal to 7.0 mg/L.

7. Flow

The City has declared that the original design flow of the Valdez WWTP is 1.5 mgd. A flow limit of 1.25 mgd was specified in the 1985 permit. A flow limit is not included in the draft permit. Adherence to the design flow is accounted for through mass loading limitations which have been calculated in the draft permit based on a design flow of 1.5 mgd.

8. Residues

The Alaska water quality standards require surface waters of the state to be free from floating solids, debris, sludge, deposits, foam, scum, or other residues of any kind in concentrations causing nuisance, objectionable, or detrimental conditions or that make the water unfit or unsafe for the use. Residues may not, alone or in combination with other substances or wastes, (1) make the water unfit or unsafe for the use; (2) cause acute or chronic problem levels as determined by bioassay or other appropriate methods; (3) cause a film, sheen, or discoloration on the surface

of the water or adjoining shorelines; (4) cause leaching of toxic or deleterious substances; or (5) cause a sludge, solid, or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the bottom, or upon adjoining shorelines.

The 1985 permit states that there shall be no discharge of floating solids or visible foam, or oily wastes which produce a sheen on the surface of the receiving water. The draft permit has been updated to reflect the current water quality standard for residues.

9. Total Ammonia

Ammonia is a common parameter found in POTW effluent. Low concentrations of ammonia can be toxic to freshwater fish, particularly salmonids. Un-ionized ammonia (NH_3) is the principal toxic form of ammonia. The ammonium ion (NH_4^+) is much less toxic. The relative percentages of these two forms of ammonia in the water vary as the temperature and pH vary. As the pH and temperature decrease, the percentage of ammonia that is in the un-ionized form increases, causing increased toxicity. Because the toxicity of ammonia is dependent upon pH and temperature, the water quality criteria are also pH and temperature dependent.

EPA does not have sufficient information to apply ammonia limits to the Valdez WWTP effluent. Monitoring of the effluent for ammonia is required in the draft permit. The impact of ammonia on the receiving water will be reviewed when the next permit is issued. Because of the pH and temperature dependence of ammonia, the draft permit includes effluent and ambient monitoring requirements for temperature and pH.

D. Antidegradation

In addition to water quality-based limitations for pollutants that could cause or contribute to exceedances of standards, EPA must consider the State's antidegradation policy (18 AAC 70.015). This policy is designed to protect existing water quality when the existing quality is better than that required to meet the standard and to prevent the water quality from being degraded below the standard when existing quality just meets the standard. The draft permit will result in no increases in the authorized pollutant loadings to Unnamed Stream No. 221-60-11390 and Port Valdez. Therefore, the draft permit is consistent with Alaska's antidegradation policy.

Appendix C
Permit Limit Calculations

This appendix steps through the calculations for developing water-quality based permit limits. In determining whether water quality-based limits are needed and in developing those limits when necessary, the EPA uses the following steps:

1. Determine the appropriate water quality criteria
2. Determine whether there is "reasonable potential" to exceed the criteria
3. If there is "reasonable potential", develop WLAs
4. Develop effluent limitations based on WLAs

Step 1 - Determine the appropriate water quality criteria

The first step in developing water quality-based limits is to determine the applicable water quality criteria. Applicable water quality criteria for permit parameters are provided in Appendix B.

Step 2 - Determine whether there is "reasonable potential" to exceed the criteria

Reasonable potential to exceed the criterion exists if the projected maximum concentration in the receiving water exceeds the water quality criterion. Reasonable potential (RP) calculations have been utilized for those pollutants with monitoring data and state criteria. The maximum projected receiving water concentration (C_d) is calculated using a mass balance equation. It is based on the maximum projected effluent concentration, dilution (if available), and the background pollutant concentration, as represented in the following equation:

$$C_d = C_u + \frac{C_e - C_u}{D}$$

where,

C_d= concentration of discharge at the edge of the mixing zone
C_u = upstream concentration or background concentration of pollutant
C_e = maximum projected effluent concentration
D = dilution

The maximum projected effluent concentration (C_e) represents the upper bound of the expected lognormal distribution of effluent concentrations at a high confidence level. It is calculated based on a Reasonable Potential Multiplier (RPM) and the maximum effluent concentration. The RPM is calculated through a statistical analysis of the data and is based on the Coefficient of Variation (CV) of the monitoring data and the number of data points.

The projected effluent concentration after consideration of dilution is compared to the appropriate water quality criterion to determine the potential for exceeding that criterion and the need for an effluent limit.

A. Calculation of the RPM

The RPM depends upon the number and variability of the effluent data points. First, the highest measured effluent concentration is characterized based on the desired confidence level, as described by the following equation:

$$p_n = (1 - \text{confidence level})^{1/n}$$

where,

p_n = percentile represented by the highest concentration in the data
n = number of data points

Next, is the relationship between p_n and the percentile represented by the desired upper bound of the lognormal effluent distribution (in this case the 99th percentile). This relationship is represented by the following equation:

$$RPM = \frac{C_{99}}{C_{p_n}} = \frac{\exp(2.326s - 0.5s^2)}{\exp(zs - 0.5s^2)}$$

where,

RPM = Reasonable Potential Multiplier
2.326 = normal distribution value for the 99th percentile
z = normal distribution value for the percentile p_n
$\sigma^2 = \ln(CV^2 + 1)$, where CV = coefficient of variation

B. Calculation of the Projected Maximum Effluent Concentration

The projected maximum effluent concentration is calculated from the RPM and the maximum reported effluent value:

$$C_e = RPM \times \text{maximum reported effluent value}$$

Step 3 - Develop Wasteload Allocations

The WLA is used to determine the level of effluent concentration that would comply with the water quality standards in the receiving water. A WLA is determined only for those parameters that have a reasonable potential to cause an exceedance of water quality standards.

WLAs are calculated using the same mass balance equations used to calculate the concentrations of the pollutants at the edge of the mixing zones. However, the dilution is multiplied by the water quality criterion to determine the highest end-of-pipe concentration that would meet the criterion at the mixing zone boundary. In the absence of a mixing zone, the water quality criterion becomes the WLA.

Step 4 - Develop effluent limitation based on WLAs

A. Convert WLAs to Long Term Averages

The acute and chronic WLAs are converted to acute and chronic Long Term Average (LTA) concentrations (LTA_{acute} and $LTA_{chronic}$) using the following equations (refer to Section 5.4 of TSD):

$$LTA_{acute} = WLA_{acute} \times e^{[0.5\sigma^2 - z\sigma]}$$

where,

CV = coefficient of variation of the effluent concentration
= standard deviation/mean
$\sigma^2 = \ln(CV^2 + 1)$, where CV = coefficient of variation
z = normal distribution value (2.326 for 99th percentile probability basis)

$$LTA_{chronic} = WLA_{chronic} \times e^{[0.5\sigma_4^2 - z\sigma_4]}$$

where,

CV = coefficient of variation of the effluent concentration
= standard deviation/mean
$\sigma_4^2 = \ln(CV^2 \div 4 + 1)$, where CV = coefficient of variation
z = normal distribution value (2.326 for 99th percentile probability basis)

B. Calculate Average Monthly Limits and Maximum Daily Limits from LTAs

To protect a water body for both acute and chronic effects, the more limiting of the calculated LTA_{acute} and $LTA_{chronic}$ is used to derive the effluent limitations. The TSD recommends using the 95th percentile for the Average Monthly Limit (AML) and the 99th percentile for the Maximum Daily Limit (MDL).

$$AML = LTA \times e^{[z\,\sigma_n - 0.5\,\sigma_n^2]}$$

where,

$\sigma_n^2 = \ln(CV^2/n + 1)$, where *CV* = coefficient of variation
z = 1.645 for 95th percentile probability basis
n = number of sampling events required per month = 4

$$MDL = LTA \times e^{(z\,\sigma - 0.5\,\sigma^2)}$$

where,

$\sigma^2 = \ln(CV^2 + 1)$, where *CV* = coefficient of variation
$z = 2.326$ for 99th percentile probability basis

C. Mass Limitations

Mass loadings are calculated based on the concentration limit and design flow:

Mass Loading (lbs/day) = Concentration Limit (mg/L) x Design Flow Rate (mgd) x 8.34

where,

8.34 = conversion factor

Example Calculation: Chlorine Limits Protective of Fresh Water Uses

Step 1 - Determine the appropriate water quality criteria

The most stringent state water quality criteria for total residual chlorine to protect freshwater designated uses are:

Acute: 19 µg/L = 0.019 mg/L
Chronic: 2 µg/L = 0.002 mg/L

Step 2 - Determine whether there is "reasonable potential" to exceed the criteria

A. Calculate the Reasonable Potential Multiplier

$$p_n = (1 - \text{confidence level})^{1/n}$$

n = 76 (Number of samples from DMR from January 1995 to May 2001, excluding outliers)
Confidence level = 99

Therefore,

$$p_n = (1 - 0.99)^{1/76} = 0.941$$

$$RPM = \frac{C_{99}}{C_{p_n}} = \frac{\exp(2.326s - 0.5s^2)}{\exp(zs - 0.5s^2)}$$

z for p_n = 1.565
Coefficient of variation = CV = 1.081
$\sigma^2 = ln(1.081^2 + 1)$ = 0.774
σ = 0.880

Therefore,

$$RPM = \frac{C_{99}}{C_{pn}} = \frac{\exp(2.326 \times 0.880 - 0.5 \times 0.774)}{\exp(1.565 \times 0.880 - 0.5 \times 0.774)} = 2.0$$

B. Calculate the Projected Maximum Effluent Concentration

C_e = *RPM x maximum reported value*

RPM = 2.0
Maximum reported value = 0.11 mg/L

Therefore,
C_e = *2.0 x 0.11 = 0.2 mg/L*

C. Calculate the Maximum Projected Receiving Water Concentration

Because there is no dilution:
$C_d = C_e$

C_d = *0.2 mg/L = 200* µg/L

Compare C_d to the water quality standard:

200 µg/L > 19 µg/L (acute water quality standard)
200 µg/L > 2 µg/L (chronic water quality standard)

The receiving water concentration exceeds the acute and chronic water quality criteria. Because there is "reasonable potential" to exceed the water quality criteria, WQBELs are required.

Step 3 - Develop Wasteload Allocations

With no dilution, the WLA is equal to the water quality criterion:
$WLA_{acute} = C_d$ = 19 µg/L = 0.019 mg/L

$WLA_{chronic} = C_d$ = 2 µg/L = 0.002 mg/L

Step 4 - Develop effluent limitation based on WLAs

A. Convert WLAs to Long Term Averages

$$LTA_{acute} = WLA_{acute} \times e^{[0.5\sigma^2 - z\sigma]}$$

WLA_{acute} = 0.019 mg/L
CV = 1.081
$\sigma^2 = ln(CV^2 + 1)$ = 0.774
σ = 0.880
z = 2.326 for 99th percentile

$$LTA_{acute} = 0.019 \times e^{[0.5 \times 0.774 - 2.326 \times 0.880]} = 0.00361 \text{ mg/L} = 3.61 \text{ µg/L}$$

$$LTA_{chronic} = WLA_{chronic} \times e^{[0.5\sigma_4^2 - z\sigma_4]}$$

$WLA_{chronic}$ = 0.002 mg/L
CV = 1.081
$\sigma_4^2 = ln(CV^2 \div 4 + 1)$ = 0.256
σ_4 = 0.506
z = 2.326 for 99th percentile

$$LTA_{chronic} = 0.002 \times e^{[0.5 \times 0.256 - 2.326 \times 0.506]} = 0.0007 \text{ mg/L} = 0.7 \text{ µg/L}$$

B. Calculate Average Monthly and Maximum Daily Permit Levels

$LTA_{chronic}$ is lower than LTA_{acute}, therefore use $LTA_{chronic}$ to calculate the permit levels.

$$MDL = LTA \times e^{(z\sigma - 0.5\sigma^2)}$$

LTA = 0.0007 mg/L
CV = 1.081
$\sigma^2 = ln(CV^2 + 1)$ = 0.774
σ = 0.880
z = 2.326 for 99th percentile

$$MDL = 0.0007 \times e^{(2.326 \times 0.880 - 0.5 \times 0.774)} = 0.00368 \text{ mg/L} = 3.68 \text{ µg/L}$$

$$AML = LTA \times e^{(z\sigma - 0.5\sigma^2)}$$

LTA = 0.0007 mg/L
CV = 1.081
$\sigma^2 = \ln(CV^2 \div 4 + 1)$ = 0.256
σ = 0.506

z = 1.645 for 95th percentile

$$AML = 0.0007 \times e^{(1.645 \times 0.506 - 0.5 \times 0.256)} = 0.00142 \text{ mg/L} = 1.42 \text{ µg/L}$$

C. Calculate Mass Loading Limitations

Mass Loading (lbs/day) = Concentration Limit (mg/L) x Design Flow Rate (mgd) x 8.34

MDL = 0.00368 mg/L x 1.5 mgd x 8.34 = 0.05 lbs/day
AML = 0.00142 mg/L x 1.5 mgd x 8.34 = 0.02 lbs/day

Appendix D
Essential Fish Habitat Assessment

Pursuant to the requirements for Essential Fish Habitat (EFH) assessments, this appendix contains the following information:

1. Listing of EFH Species in the Facility Area
2. Description of the Facility and Discharge Location
3. EPA's Evaluation of Potential Effects to EFH

1. Listing of EFH Species in the Facility Area

Informal consultation with NMFS identified the following EFH species in Port Valdez: salmon (pink, chum, sockeye, chinook, and coho), herring, halibut, Tanner crab, Dungeness crab, spot shrimp, coon-striped shrimp, and several species of rock fish. (J. Hanson, personal communication, August 17, 2001)

2. Description of the Facility and Discharge Location

The facility activities and wastewater sources for the Valdez WWTP are described in Part II, *Facility Information* of this fact sheet. The location of the outfall is described in Part III, *Receiving Water.*

3. EPA's Evaluation of Potential Effects to EFH

Water quality is an important component of aquatic life habitat. NPDES permits are developed to protect water quality in accordance with state water quality standards. The standards protect the beneficial uses of the waterbody, including all life stages of aquatic life. The development of permit limits for an NPDES discharger include the basic elements of ecological risk analysis. The underlying technical process leading to NPDES permit requirements incorporates the following elements of risk analysis:

<u>Effluent Characterization</u>

Characterization of the Valdez WWTP effluent was accomplished using a variety of sources, including:

Permit application monitoring
Permit compliance monitoring
Effluent variability
Quality assurance evaluations

Identification of Pollutants of Concern and Threshold Concentrations

Identification of pollutants of concern including:

Pollutants with aquatic life criteria in the Alaska water quality standards. No other pollutants of concern were identified by NMFS.

Exposure and Wasteload Allocation

Analysis of the transport of pollutants near the discharge point with respect to the following:

Mixing zone policies in the Alaska water quality standards
Dilution modeling and analysis
Exposure considerations (e.g., prevention of lethality to passing organisms)
Consideration of multiple sources and natural background concentrations

Statistical Evaluation for Permit Limit Development

Calculation of permit limits using statistical procedures addressing the following:

Effluent variability and non-continuous sampling
Fate/transport variability
Duration and frequency thresholds identified in the water quality criteria

Monitoring Programs

Development of monitoring requirements, including:

Compliance monitoring of the effluent
Ambient monitoring

EPA's approach to aquatic life protection is outlined in the *Technical Support Document for Water Quality-based Toxics Control* (EPA/505/2-90-001, March 1991). EPA and states evaluate toxicological information from a wide range of species and life stages in establishing water quality criteria for the protection of aquatic life.

The NPDES program evaluates a wide range of chemical constituents (as well as WET testing results) to identify pollutants of concern with respect to the criteria values. When a facility discharges a pollutant at a level that has a "reasonable potential" to exceed the water quality criteria, permit limits are established to prevent exceedances of the criteria in the receiving water (outside any authorized mixing zone).

Since the draft permit has been developed to protect aquatic life species in the Unnamed Stream No. 221-60-11390 and Port Valdez in accordance with the Alaska water quality standards, the EPA has tentatively determined that the reissue of this permit is **not likely to adversely affect** any EFH in the vicinity of the discharge. The EPA will provide NMFS with copies of the draft permit and fact sheet during the public notice period. Any recommendations received from NMFS regarding EFH will be considered prior to the reissue of this permit.